

COLLEGE of CHARLESTON

DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY



ANNUAL REPORT

2008-09

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I. DEPARTMENTAL ACCOMPLISHMENTS

The American Chemical Society again recognized the Department of Chemistry & Biochemistry of the College of Charleston as one of the top 20 producers of certified bachelor's graduates in chemistry/ biochemistry. For the 2006-07 academic year (the latest year for which data is available- Chemical & Engineering News, December 15, 2008), we ranked #20 (UT-Austin was #1) and among schools that do not have a chemistry graduate program we ranked #2. This is our fourth consecutive year in this Elite Top 20. Certified graduates complete an ACS prescribed program which includes fundamental as well as advanced course work in all five areas of chemistry and at least 400 laboratory clock hours beyond the introductory level.



During this past academic year we graduated 26 students, 24 with certified degrees, 17 of which were in biochemistry. Three students graduated *magna cum laude* and six graduated *cum laude*.

Our students performed extremely well on the Major Field Test in Chemistry of the Educational Testing Service. Three students (Richard Liberatore, Jonathan Puza, and Hugh Wright) scored in the 90th percentile or higher overall. As a class the average score was the 60th percentile.



We bid farewell to Professor Gary Asleson who was granted emeritus status in May 2009. Gary in his thirty-four year career taught hundreds of our majors in Quantitative Analysis as well as hundreds more in our introductory general chemistry and organic chemistry courses. He garnered such honors as the Distinguished Advising Award of the College of Charleston, the William Mebane Teaching Chair in Chemistry & Biochemistry, and nationally was recognized with the 2004 Recipient of the Ronald T. Pflaum Award of Alpha Chi Sigma as the outstanding Faculty Chapter Advisor. He served as the Faculty Advisor to our Gamma Delta Chapter from its inception in 1982 until fall 2008. Dr. Justin Wyatt now wears that mantle.

Dr. Wendy Cory, in her second year at the College, received a NSF-MRI grant for a new HPLC system. She is in analytical chemistry with a Ph.D. from the University of Florida. Her undergraduate research program is studying pharmaceutical degradation. She will be teaching in the First Year Experience program this coming year.



Dr. Richard Lavrich, also in his second year at the College, is a physical chemist (Ph.D., Kent State University) who recently been awarded a start-up grant from the Research Corporation. He is performing a systematic investigation of the forces involved in the formation of secondary peptide structure. He studies rotational spectra using microwave spectroscopy.



Dr. Pam Riggs-Gelasco is the Principal Investigator for the multi-departmental \$1.5 million grant from the Howard Hughes Medical Institute. For our department this will result in adding a new line to support a new field of study within our biochemistry program – chemical biology. We will be conducting this search during the 2009-2010 academic year. This program hopes to encourage student interest in biomedical science through First Year Experience sections of CHEM 111. It also broadens opportunities for undergraduate research students and to recruit minority high school students into science programs.

Andrei Straumanis was on leave to the University of Washington – Seattle to work his \$596,498 grant from the US Department of Education to study using the POGIL method to teach organic chemistry to very large classes.



Dr. Justin Wyatt returned in the fall after a sabbatical as a visiting scientist at the Walter and Eliza Hall Institute of medical Research in Melbourne, Australia. He is the vice-president for the South Carolina Academy of Science and as such will be the program chair for the 2010 annual meeting which will be held here at the College of Charleston. He is also the faculty advisor for the Gamma Delta Chapter of Alpha Chi Sigma. His research involves trying to develop a new type of antibiotic. Along with Dr. Riggs-Gelasco, he is one of the INBRE faculty in the department with support from this NIH sponsored program. Dr. Jim Deavor is the PI for this grant.

The department continued its outreach programs by supporting the Lowcountry Science Fair and Math Meet, participating in the South Carolina Section of the American Chemical Society, the South Carolina Association of Chemistry Teachers, and the local chapter of Sigma Xi. We again hosted the Laboratory Safety Institute workshop in August.



We are looking forward to the completion of the new 125,000 square foot science building being constructed on the corner of Calhoun and Coming Streets across from the Addlestone Library. Substantial completion is set for early November with move-in occurring over the Christmas break. Spring 2010 classes will be held in this new facility. This department will entirely be housed in the new building and will inhabit portions of the first and third floors. Introductory labs, the stockroom, a large auditorium, and a couple of research labs will be on the first floor. Advanced labs, instrument rooms, and many more research labs will be on the third floor. Faculty offices will be divided between the first and third floors. The SSM dean's office will be on the first floor while the departmental office will be on the third floor.

II. TEACHING

A. Student Accomplishments

Student	Degree	Date	Honors	Post-graduate Plans	Location
LaChanda Anaga-Nwoke	BS CHEM	Dec-08			
Lawren Anderson	BA CHEM	May-09			
Chrstine Cahill	BS BIOCHEM	May-09	<i>Magna cum laude</i>	Pharmacy School	Mercer University
Brittney Henderson	BS BIOCHEM	May-09	Cum laude	Chemist	Research Triangle Park
Sloan Hess	BS CHEM	May-09		Graduate School	U of Denver
Ryan Hooss	BS BIOCHEM	Dec-08			
Allison Horger	BS CHEM	May-09			
Matthew Hunter	BS BIOCHEM	May-09			
Erik Johnstone	BS CHEM	May-09			
Zachary Kennedy	BS CHEM	May-09	<i>Cum laude</i>	Graduate School	U of Oregon
Kelly King	BS BIOCHEM	Dec-08			
Richard Liberatore	BS CHEM	May-09	<i>Magna cum laude</i>	Graduate School	U of Pittsburgh
Kirstin Morton	BS BIOCHEM	May-09		Graduate School	Indiana University
Kella Player	BS BIO AND BIOCHEM	Dec-08			
Chandra Potter	BS CHEM	May-09	<i>Cum laude</i>	Graduate School	Emory University
Steven Power	BS BIOCHEM	Dec-08			
Jonathan Puza	BA CHEM	May-09	<i>cum laude</i>	Dental School	MUSC
Jessica Reese	BS CHEM	Dec-08			
Andrea Shipp	BS BIO AND BIOCHEM	May-09	<i>Magna cum laude</i>	Medical School	MUSC
Jessica Sisco	BS BIOCHEM	May-09		Psychology 2 nd degree	CofC

Zachary	Stansell	BS CHEM	Dec-08			
Erika	Trent	BS BIOCHEM BA BIO	May-09			
Jennifer	Von der Heiden	BS BIOCHEM BA BIO	May-09	<i>Cum laude</i>	Moving to Japan	
Sidfun	Wong	BS BIOCHEM AND BIO	Dec-08			
Tammi	Wood	BS BIOCHEM	Dec-08			
Hugh	Wright III	BS BIOCHEM	May-09	<i>Cum laude</i>	Medical School	MUSC

The following students received departmental awards:

Outstanding Student (Chemistry)



Richard Liberatore

Outstanding Student (Biochemistry)



Christine Cahill

Departmental Honors (Chemistry)

Richard Liberatore

Departmental Honors (Biochemistry)

Christine Cahill
Brittney Henderson
Zachary Kennedy

American Chemical Society Outstanding Chemistry Major

Richard Liberatore

American Institute of Chemists Foundation Award in Chemistry

Chandra Potter

American Institute of Chemists Foundation Award in Biochemistry

Brittney Henderson

Carl J. Likes Award in Physical Chemistry

Zichao Wang

The Hypercube Scholar Award

Zachary Kennedy

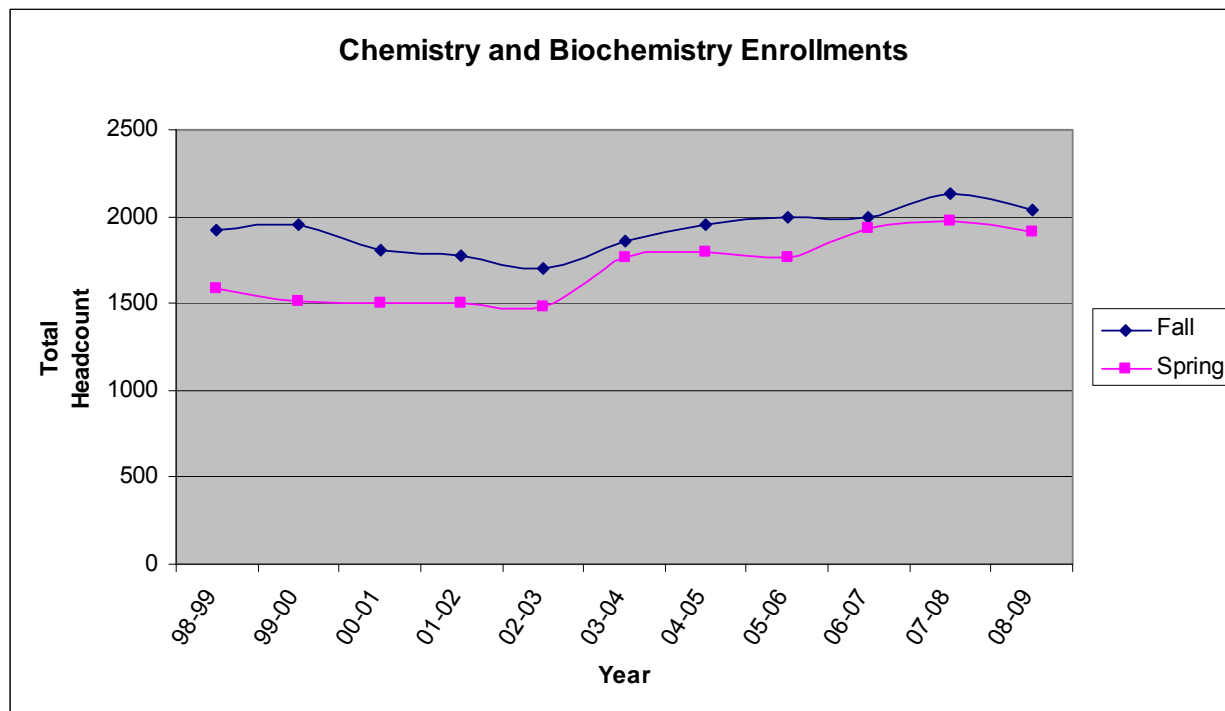
Eleven chemistry/biochemistry students received SURF grants from URCA: Corbyn Harris, Thomas Jenkins, Kevin Djordjevic, Meredith Kaywood, Corey Klein, Chris Marvin, Elizabeth Redpath, Daniel Smith, Elyn Smith, Andrew Stubenrauch, and Zichao Wang.

At the South Carolina Academy of Science Annual Meeting Elyn Smith won the Sigma Xi award for the outstanding chemistry undergraduate presentation.



B. Enrollment

In the fall we reported a total of 145 majors to CHE with 96 of those being in our biochemistry program. In the 2008-09 academic year saw an enrollment decrease from 2129 to 2037 (4.3%) for fall and spring semesters combined. More details may be found in the appendices.



III. Research

Serving as mentors for undergraduate research takes energy, intelligence, imagination, and love for both students and for science. It is best measured in terms of hours and sweat, occasionally some blood and tears.

It can be measured in terms of the successes that our students achieve after they leave the College of Charleston. It can be measured in the presentations that our faculty and students make. Venues for presentations included the Southeast Regional Meeting of the American Chemical Society, the national meetings of the American Chemical Society, South Carolina Academy of Science, and the College of Charleston Poster Session.

The gold standard in terms of metrics is publications. Below are the publications of our faculty and students that appeared with 2008 publication dates. Undergraduate co-authors are denoted with an asterisk; CofC faculty are in bold face.

*Knight, J. D., **Metz, C. R., Beam Jr, C.**, Pennington, W. T., VanDerveer, D. G. (2008). New Strong Base Synthesis of Symmetrical 1,5-Diaryl-1,3,5-pentanetriones from Acetone and Benzoate Esters, (Synthetic Communications), 38, 2465-2482.



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*Dawsey, A. C., *Knight, J. D., **Beam Jr, C.**, Camper, D. N. (2008). Preparation of 2-[1-Phenyl-1H-pyrazol-5-yl]benzoic Acids from Dilithiated C(=O),N-Phenylhydrazones and Methyl Hydrogen Phthalate, (Synthetic Communications), 38, 4150-4159.



Choi, E., *Knight, J. D., *Malatanos, M. D., *Rhett, M. J., *Walters, M. J., *Dunn, P. S., **Beam Jr, C.** (2008). Preparation of 4,5-dihydronaphth[2,1-c]isoxazoles from dilithiated 2-tetralone oxime and select esters, (New York, NY: Synthetic Communications), 38, 713-722.

*Knight, J. D., *Brown, J. B., **Overby, J. S.**, Camper, N. D., **Beam Jr, C.** (2008). Preparation of 2-(1H-pyrazol-5-yl)benzenesulfonamides from polyolithiated C(alpha),N-carbo-tert-butoxylhydrazones and methyl 2-(aminosulfonyl)benzene, *Journal of Heterocyclic Chemistry* (Provo, UT), 45, 189-194.



*Chamberlain, R., **Rogers, A. L.** (2008). "Got Bio? A Short Course Introducing Students to the Applications of Biochemistry", *Journal of Chemical Education*, 85, 658-661.

Durig, James R.; Klaassen, Joshua J.; Ganguly, Arindam; Gounev, Todor K.; **Guirgis, Gamil A.**; Lin, Wei; *Structural Chemistry* (2008), 19(6), 935-948.

Nielsen, Claus J.; Horn, Anne; Klaeboe, Peter; **Guirgis, Gamil A.** *Journal of Molecular Structure* (2008), 886(1-3), 90-102.

Horn, Anne; Klaeboe, Peter; Nielsen, Claus J.; **Guirgis, Gamil A.** *Journal of Molecular Structure* (2008), 879(1-3), 102-112.



Guirgis, Gamil A.; Yu, Zhenhong; Zheng, Chao; Zhou, Sarah Xiaohua; Durig, James R. *Journal of Physical Chemistry A* (2008), 112(11), 2268-2281



K. D. Krantzman, R. P. Webb and B. J. Garrison "Simulations of C₆₀ Bombardment of Si, SiC, diamond and graphite", *Appl. Surf. Sci.*, **2008**, 244, 837-840.

External grant activity is important to both instruction and undergraduate research. There are several major grants to report. The first is part of the IDeA Networks of Biomedical Research Excellence (INBRE) at NIH. The purpose of the SC-INBRE Program is to foster health-related research and increase the competitiveness of SC investigators for grant awards from the National Institutes of Health (NIH) by programmatic expansion and networking of research activities of both faculty and students. Drs. Pam Riggs-Gelasco and Justin Wyatt are participants from our department in this grant that began in 2005 and will end in April 1020. Dr. Jim Deavor is CofC PI. The submission of a renewal application is underway.

The second grant is supporting Andrei Straumanis' while on leave at the University of Washington at Seattle where he is testing POGIL in 400-student sections of organic chemistry at UW. He is the Principal Investigator of a \$596,498 FIPSE grant to develop and study large-class POGIL (Process Oriented Guided Inquiry Learning). This research based learning environment is one where students are actively engaged in mastering course content and in developing essential skills by working in self-managed teams on guided inquiry activities.



Dr. Pam Riggs-Gelasco serves as the PI/Program Director for a 1.5M\$ Howard Hughes Medical Institute Grant that will create "learning communities" focused on three interdisciplinary areas: computational biology, chemical biology, and neuroscience. Students with similar interests will study, take classes, and live together in these learning communities during their first year of study. The College will also use the HHMI grant to fund 27 summer research fellowships, add two science faculty members (one in our department who will specialize in chemical biology), assist students and science teachers at a local high school that is predominantly African American, and expand the activities of the Lowcountry Hall of Science and Math, a resource center for middle- and high-school teachers in the Charleston area.

IV. Service

The third area of faculty responsibility is service. Chemistry and Biochemistry faculty are found among the campus leaders. Our two faculty senators were Justin Overby and Pam Riggs-Gelasco. Many served on school or college-wide committees. Of particular note are the following activities:

Wendy Cory	Member, Faculty Governance Committee
Jim Deavor	Co-chair, President's Strategic Planning Committee
Rick Heldrich	Chair, Faculty Grievance Committee
Pam Riggs-Gelasco	Chair, Faculty Advisory Committee on Tenure & Promotion; Member, provost Search Committee



Frank Kinard serves as the secretary of the Nuclear Chemistry Division of the American Chemical Society (ACS). He also is the director of their Nuclear and Radiochemistry Summer School hosted at San Jose State University

V. ADMINISTRATION

The department continues to be chaired by Dr. Jim Deavor with Dr. Rick Heldrich as Associate Chair. We are served by a wonderful support staff with Jeff Tomlinson as Office/Stockroom Manager, Shena Laymon as his assistant, Steve Jones as our Instrument manager, and Don Barrett as the SSM Electronics Technician. Shena joined us in August. Rachel Collier also joined us in the summer of 2008 as our administrative assistant as Jennifer Neal left as our Administrative Assistant in May.



Don Barrett



Steve Jones



Rachel Collier



Shena Laymon



Jeff Tomlinson

With the state budget cuts, all state institutions took cuts, and all departments on campus took hits, including ours. We lost one vacant faculty line and one administrative support line. We also saw an ~8.4% cut in our operating budget.

